SFOF Configuration Control

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This article describes the need for and design of a Space Flight Operations Facility Configuration Control System based on the highly dynamic nature of the facility and the unique, critical requirements levied upon it by multiple and simultaneous flight projects supported by various JPL functional organizations.

I. Introduction

The Space Flight Operations Facility (SFOF) provides capabilities which make it possible to carry out the network control and analysis functions of the Deep Space Network (DSN) and the mission control function for the Flight Projects. Generally, the facility provides equipment and space for network operations down to the facility control level; i.e., station controllers, communications controllers, computer operations chief, and support operations chief. Also for the network, it houses the control center for the Ground Communications Facility and its interfaces with the NASCOM for all external communications required to operate the network, and internal communications to support the network and mission control functions.

The network is configured to support many flight projects simultaneously. The demands of these multi-users, both in a functional and in a line organization sense, have required that the management of this facility design and implement a configuration control system to encompass all changes required. The SFOF configuration control system is concerned mainly with network equipment, but it is also used for mission-dependent hardware housed in this facility such that its interfaces with network equipment would affect the conduct of flight operations.

The article discusses hardware changes only. A parallel control system for all operational software in the many computers in this facility is under development.

II. Purpose

The purpose of the configuration control system is to allow management to have control over the detail configuration of the SFOF. This can be accomplished only through a system that requires management review of all changes, irrespective of their complexity.

Changes to the SFOF are accomplished by many functional organizations. Engineering modifications are performed by the SFOF/GCF Development Section; equipment configuration changes by the SFOF/GCF Operations Section; and physical plant modifications and configuration changes by the Plant Engineering Division. Most changes involve several agencies.

The configuration control system provides a vehicle for requesting changes to the configuration or engineering capabilities of the SFOF. It allows examination for technical feasibility and costing and funding by appropriate organizations, reviewing and commenting upon by all affected organizations, and final approval or disapproval by appropriate management.

Following the above approval cycle, the system provides the authority for accomplishment of the change and subsequent documentation requirement.

III. Background

The configuration control system for the SFOF was first implemented in October 1965. From that time until the present, more than 5000 change requests have been initiated and accomplished or cancelled through this system.

The system operation is handled by a relatively small staff of contractor personnel under the cognizance of the SFOF/GCF Operations Section configuration control engineer.

The existing design for the operation of the system has been in effect for over 1 yr and is the direct result of continuing modification and improvement.

IV. Implementation

The vehicle for the configuration control system is a two-page SFOF change request (Form 18). The requester is required to identify the request in detail on the first page and to gain the concurrence of the cognizant operations engineer from the SFOF/GCF Operations Section, and of the cognizant development engineer from the SFOF/GCF Development Section, for each system or subsystem involved in the request. This avoids interference with other planning or with existing capability and ensures completeness and technical feasibility of the request.

The request is then submitted to the configuration control office where it is numbered and becomes an official change request. It is then routed through steps to secure costing, funding, concurrence or comment by involved parties, and is subsequently approved or disapproved by the managers of the SFOF/GCF Development Section and the SFOF/GCF Operations Section. Any disagreement in final approval is arbitrated and decided upon by the Data Systems Division SFOF manager.

After a request has been authorized, a change order is issued by the configuration control engineer to the appropriate agencies for action. They advise the configuration control office when the changes have been accomplished, and documentation of the affected portions of the SFOF is updated.

All concerned parties are advised of disapproved requests. Negotiation may be initiated at this point, if appropriate. A disapproved request is cancelled if no further advice is received.

V. Feasibility

Frequent emergencies develop wherein a change is required on short notice to meet an unexpected demand on this highly diverse facility. In such cases, the change control engineer may issue an emergency change order under the authority of the SFOF manager, and the work can be accomplished in real-time. The Form 18 is initiated simultaneously, and after-the-fact approval is secured for documentation and notification to all concerned parties.

VI. Summary

The design of the configuration control system for the SFOF provides an orderly system to gain approval of a requested change to the facility and to ensure that no ramification of a request is overlooked. This system has become a valuable tool in the evolution of the SFOF.

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